

## REHABILITATION FOR COLORECTAL CANCER PATIENTS

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### Summary

Colorectal cancer incidence rates rank high, both worldwide and in Croatia. However, due to both primary and secondary prevention activities, and new treatment modalities, death rates from colorectal cancer decline while survival rates increase. Cancer is thus being increasingly viewed as a chronic illness, which should allow for the highest quality of life possible for patients having undergone cancer treatment. In order to achieve this (prevent or maximally reduce disease- and/or treatment-related side effects) rehabilitation interventions should be included in a multidisciplinary protocol for patients with colorectal cancer. Numerous worldwide cancer studies show a significant correlation between overall quality of life and survival rates.

KEYWORDS: *colorectal cancer, disease and treatment effects, quality of life, rehabilitation, multidisciplinary approach to cancer care*

### REHABILITACIJA BOLESNIKA S RAKOM DEBELOG CRIJEVA

#### Sažetak

Rak debelog crijeva je na visokom mjestu pojavnosti, kako u svijetu tako i u Hrvatskoj. Međutim, zahvaljujući primarnoj i sekundarnoj prevenciji te novim modalitetima liječenja smanjuje se stopa smrtnosti, a povećava stopa preživljenja. Tako maligna bolest postaje kronična što zahtijeva osiguranje maksimalno moguće kvalitete života liječene osobe. Da bi se to postiglo (prevenirale ili maksimalno reducirale nuspojave nastale zbog bolesti i /ili procesa liječenja) nužno je uključivanje rehabilitacije u protokol multidisciplinarnog liječenja bolesnika s rakom debelog crijeva. Brojne svjetske onkološke studije pokazuju značajnu korelaciju između sveukupne kvalitete života i stope preživljenja.

KLJUČNE RIJEČI: *rak debelog crijeva, posljedice bolesti i liječenja, kvaliteta života, rehabilitacija, multidisciplinarni pristup liječenju*

**Oncology rehabilitation** is a process of cooperation and action, oriented to the patient as a whole person (biopsychosocial model), and not to the medical condition and pathological process themselves. Rehabilitation in cancer care thus encompasses a wide range of patient functioning, including their physical, psychological, social, spiritual, work, educational, and recreational abilities. It aims at achieving the best quality of life possible in all its aspects and within limitations

due to the medical condition itself and/or treatment aftereffects. Oncology rehabilitation actually begins at diagnosis and continues through all treatment and recovery modalities. In the terminal stage of cancer, it becomes part of palliative care. Oncology rehabilitation is carried out using different rehabilitation techniques: physical therapy (kinesiotherapy, hydrotherapy, massages, thermotherapy, electrotherapy, phototherapy, natural healing factors – balneotherapy, thalassotherapy),

occupational therapy, psychotherapy, spiritual therapy, complementary/supportive therapies (creative therapy, art therapy, relaxation therapy). The effects of these techniques are observable in any body system: osteoarticular system, neuromuscular system, respiratory system, cardiovascular system, endocrine system, genitourinary system, digestive system, skin and subcutaneous tissues (1,2,3,4). Of all the techniques used in the rehabilitation process kinesiotherapy is the most represented therapeutic approach. Many studies have demonstrated the effects of exercise on both primary and secondary prevention of colorectal cancer. Exercise appears to have a dose-response reduction in the rate of colorectal cancer. The mechanism by which exercise provides this benefit is not known, but increase in insulin-like growth factor-binding protein and reduction of prostaglandins appear to be the likely cause. Once a person develops colorectal cancer the benefits of exercise appear to continue both by increasing quality of life and reducing cancer-specific and overall mortality (5,6,7). The implementation of rehabilitation requires the involvement of a rehabilitation team: physical medicine and rehabilitation specialist, physical therapist, nurse, occupational therapist, social worker, psychotherapist, spiritual counselor, art therapist, recreational therapist, prosthetic and orthotic therapist, vocational rehabilitation provider. In addition, individuals who have undergone cancer treatment and are trained on the provision of psychosocial and emotional support to new patients join the team on an as-needed basis. The patient is at the center of the rehabilitation process, and an active, equal team member who, as the rehabilitation process progresses, assumes more and more responsibility for the outcome of rehabilitation. The physical medicine and rehabilitation specialist, as a rehabilitation team leader, is also a member of the oncology team and plays an important role of coordinator within the teams. The optimal model of organizing cancer rehabilitation teams is an interdisciplinary model (1,2,8).

**Treatment strategies for colorectal cancer,** depending on pathohistological features, tumor size, disease extent, patient performance status, are multimodal and include: surgery, chemotherapy, radiation therapy, and biological therapy. All the above treatment modalities can produce side effects. The possible side effects of surgery for

colorectal cancer treatment depend on many factors, such as the extent of surgical intervention and patient pretreatment performance status, and include the following: pain, weakness, fatigue, frequent stools for 3 to 6 months, urinary and sexual dysfunction, bowel incontinence, temporary or permanent stoma. As with other extensive abdominal surgeries, the risk of bleeding, infection, deep vein thrombosis, cardiorespiratory complications, adjacent tissue damage, urethral damage, adhesion formation that can cause severe abdominal pain and intestinal occlusion. Lymphedema is also a possible more severe and long-lasting adverse effect related to surgical intervention. Radiation therapy can produce side effects, too, including frequent urination with burning sensation, more frequent bowel movements, nausea, fatigue, and skin changes in the irradiated region. Long-lasting side effects or late effects following radiation therapy may include: frequent bowel movements and urination, blood in both urine and stool, sexual dysfunction, and lymphedema. Chemotherapy can produce the following adverse effects that are usually transient in nature, including: abnormal blood count, reduced immune response, susceptibility to infections, fatigue, nausea, vomiting, frequent bowel movements, ulcerative stomatitis, alopecia, neuropathy (oxaliplatin), hand-foot syndrome (capecitabine or 5-FU regimen-related inflammatory changes in hands and feet), transient germ cell impairment. Biological (targeted) therapy is indicated for first line management or as therapy after primary treatments in metastatic disease. Side effects of this therapy include skin changes that may develop into an infection or skin peeling off, chills, fever, headache, fatigue, weakness, nausea, vomiting, diarrhea-like stools, and sensitivity reactions. Other possible disease- and treatment-related effects affect psychological, social, spiritual and professional well-being of the patient (1,2,9).

### Colorectal Cancer Rehabilitation Protocol

In order to prevent or reduce effects resulting from the disease itself and from its treatment, and shorten recovery time during hospitalization, the rehabilitation process begins on the very first day of admission, regardless of the treatment modality to be employed. In the majority of cases, surgery remains the primary treatment modality, and re-

habilitation begins with the so-called preoperative preparation, which comprises the following:

- a) assessment of physical status, psychosocial status and evaluation of all parameters on which the development of any rehabilitation program is based;
- b) patient education and preparation for any limitations that may develop in the cancer treatment process, training sessions on post-operative self-care activities and activities of daily living;
- c) provision of psychosocial support and assistance;
- d) training sessions on and patient acquisition of a kinesiotherapeutic program of special exercises to continue with after surgery.

The goals of preoperative kinesiotherapy are:

- a) achievement and maintenance of vital lung capacity, along with prevention of possible pulmonary complications of cancer therapy;
- b) prevention of deep vein thrombosis and embolism in vital organs;
- c) reduction of pain and fatigue, reduction of anxiety and depression, boosting of the immune system;
- d) prevention of prolapse and descent of the pelvic organs, hernia prevention;
- e) prevention and/or reduction of sexual dysfunction, urinary and bowel incontinence;
- f) maintenance and/or improvement of overall physical fitness allowing the performance of daily activities during and after treatment.

For all these reasons, a preoperative kinesiotherapeutic program with educational objectives is prescribed in order to be easier and more effective to continue with these exercises after surgery. The program includes: breathing exercises (diaphragmatic and abdominal), coughing exercises and exercises to aid sputum expectoration, relaxation exercises, circulation boosting exercises, joint and spine mobility exercises, muscle flexibility, stretching, strengthening and endurance exercises (for pelvic, upper knee, abdominal, and back muscles), sphincter activation and relaxation exercises (Kegel exercises to strengthen the muscles of the pelvic floor), rotation exercises in a lying position

without activation of the abdominal muscles, posture, coordination and balance exercises, patient preparation for verticalization employing proprioceptive neuromuscular facilitation – the PNF technique used to improve the biomechanical relationships with the aim of facilitating the function of the pelvic floor and anterior abdominal muscles, and reducing pain by encouragement and instruction. The postoperative rehabilitation process proceeds after surgery upon the surgeon's decision. The kinesiotherapeutic program resumes exercises of the acquired preoperative program. On postoperative days 1-2 already, exercises for prevention of respiratory and cardiovascular events are started to proceed with exercises for prevention of mobility limitation at the surgical site, prevention or reduction of pain, improvement of muscle flexibility and strength and joint mobility, by positioning, verticalization and shorter walks. Verticalization and gait training should be done gradually and with caution when muscles are sufficiently toned, with the recommended use of an abdominal binder or corset. Along with the kinesiotherapeutic program, occupational therapy programs are also provided with the aim of achieving complete independence in performing any self-care activities and the activities of daily living. If necessary, both a psychotherapist and a volunteer – a person who has already undergone treatment for the same disease and has been trained to provide non-medical psychoemotional and social support, are also engaged in the postoperative rehabilitation program. Rehabilitation is carried out along with other treatment modalities, and in the terminal stage of the disease, rehabilitation interventions get included in palliative care practices (1,2,3,4,10,11).

### **Early Rehabilitation for Disease- and/or Treatment-Related Effects**

#### *Fecal Incontinence*

According to its definition, fecal incontinence implies the occasional or continuous inability to control the passage of stools (more than 10 mL) for at least one month in individuals over 3 years of age. Normal control of bowel movements depends on a number of factors: the consistency and amount of stool, intestinal motility, extensibility of the rectum, functioning of the anal sphincter muscles, innervation of tissues and organs sur-

rounding the last portion of the rectum including anorectal reflexes. The anatomical barrier that ensures bowel continence is the wall of the last section of the rectum, the inner and external anal sphincter and puborectal supporting muscles.

In patients with colorectal cancer fecal incontinence may result from anal sphincter dysfunction due to an infiltrative tumor process, damage to the pudendal nerve during surgery, reduced rectal permeability once the defecation reflex is triggered, and a minimal amount of stool in post-irradiation colitis. Due to impairment of the pudendal nerve that innervates the pelvic floor muscles, these muscles become weaker which also results in incontinence. The pudendal nerve arises from branches of the 2-4 sacral nerve, it motorically innervates the external anal sphincter, external urethral sphincter, pelvic floor muscles, and has a sensory function in the skin surrounding the anus and perineum, lower third of the anal canal and the genitals. The recommended therapy includes: exercises to strengthen the pelvic floor muscles (Kegel exercises) which support inner abdominal muscles and tissues, help urinary bladder and intestinal filling and emptying, and sexual function maintenance. The activation of upper leg muscles and large gluteal muscle triggers the activation of the pelvic floor muscles, too. Better posture, coordination, balance and stronger abdominal muscles may also help the pelvic floor muscles with performing the activities of daily living. Other physical therapy techniques are also employed: biofeedback, electric stimulation of the sphincter and pelvic floor, transcutaneous electrical nerve stimulation (TENS). Surgical treatment for incontinence includes partial sphincter repair or post-anal repair, and artificial sphincter implantation (1,2,9,12,13,14).

#### *Urinary and Sexual Dysfunction*

In rectal cancer surgery the autonomic nerves should be preserved whenever possible. Careful total mesorectal excision (TME) can preserve both urinary and sexual function in 75 to 85% of the cases. In other cases, surgical or radiation therapy damage to adjacent nerves and blood flow results in urinary and sexual dysfunction. The recommended therapy for this dysfunction includes medical exercises, biofeedback, electric stimulation of the sphincter and pelvic floor, and TENS (1,2,9,).

#### *Lymphedema*

Lymphedema is an excessive collection of protein-rich fluid in the interstitial tissues, causing chronic inflammation and reactive fibrosis of the affected tissue. It results from lymphatic failure occurring when the transport capacity of the lymphatic system becomes unable to cope with the amount of proteins and water, and when all other replacement mechanisms have already been used. Lymphedema of the lower extremities in colorectal cancer patients occurs as a result of surgical treatment and radiation therapy. The incidence and severity depend on the therapy extent, degree of local lymphatic damage, and the compensatory mechanism of the lymphatic system. The most common complications of untreated lymphedema are erysipelas and cellulitis. Therapy for lymphedema involves complete decongestive physical therapy (manual lymph drainage, kinesiotherapy, compression bandaging, skin care, education), and should be started immediately after the development of lymphedema (1,2).

#### *Neuropathy*

Neuropathy symptoms develop during chemotherapy treatment (oxaliplatin), but may also occur 2 to 11 years after diagnosis of colorectal cancer. The first extremities affected are distal extremities, and the first nerves affected are small sensory, afferent nerve endings that transmit touch, temperature and pain sensations, also with potential hyperesthesia and hyperalgesia. Dysesthesia as an abnormal perception of a sensory stimulus, tactile in particular (numbness, burning, tingling, prickling, heat, cold), is manifested in the field of fine motor skills as a reduced ability to perform skillful movements, particularly hand movements. Symptoms of damage to motor nerve fibers include muscle weakness and hypotrophy/atrophy, decreased muscle tone and loss of the myotactic reflex, and occasionally weak muscle contractions in the hands and feet. Some patients suffer significantly more severe damages accompanied with impaired coordination and sensory ataxia if thicker muscle fibers responsible for proprioceptive sensation are affected. Walking impairment, as a result of inadequate proprioception in the lower extremities, will affect posture, performance of daily activities and overall quality of life. The resulting impairments are addressed by



different forms of rehabilitation including: kinesiotherapy, massage techniques, relaxation techniques, acupuncture techniques, transcutaneous electrical nerve stimulation (TENS), laser techniques, biofeedback, work therapy, use of orthotics and other aids. When neuropathy interferes with the activities of daily living the occupational therapist may recommend a compensation strategy as regards activities and appropriate modifications and adjustments to any equipment and facilities. The workplace can and should undergo ergonomic evaluation, and be modified to compensate for extremity weakness. Unpleasant painful sensations require additional pharmacological management according to the neuropathic pain treatment guidelines. Peripheral neuropathy can either be transient or permanent, with transient peripheral neuropathy occurring more frequently (1,2,15).

*Psychological, Social, Occupational, and Spiritual Effects of the Disease and/or Treatment*

Factors that influence psychological adjustment to the disease include: disease and treatment characteristics, personal characteristics (both intra- and interpersonal), and social factors. Physical illness alters both the self-image and the body-image. Psychological distress most often has the symptoms of anxiety and depression. Some symptoms, such as fatigue, insomnia, palpitations, loss of appetite and alike, may be similar to the symptoms of physical illness or therapy side effects. Social effects occur for fear of social isolation due to illness-related stigma, or social discrimination for the loss of work capacity. Spiritual pain and suffering occur for being threatened by the loss of meaning in life and existential values. Each of the responses has a psychophysical background of its own and diminishes the body's natural defense mechanism capacity for healing. Therapies that can help the patient are: psychotherapy, work therapy, spiritual therapy, complementary/supportive therapies. The patient needs support from his family, friends, and even engagement of the wider community to accept the disease and any changes that may develop in the course of treatment, correct the attitude towards the disease, develop motivation for healing and completely adjust to this new situation. Very often family members may also need the same support. The methods to

be used include individual interviews, counseling, group meetings led by a professional, or self-help groups formed as clubs assisting patients who have undergone treatment (16,17,18,19,20,21).

*Outcome Assessment*

The assessment of treatment outcomes plays an invaluable role in monitoring the dynamics of the patient's health status, evaluating success and eventually prognosis. This is also a great motivation for both the patient and all team members. The most commonly used questionnaires for outcome assessment purposes are as follows: Cancer Rehabilitation Evaluation System - short form (CARES-SF), Functional Assessment of Cancer Therapy-General (FACT-G), European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC-QLQ), Functional Living Index-Cancer (FLIC), Quality of Life Index-Cancer (QLI), Edinburgh Rehabilitation Status Scale (ERSS). (1,2).

## CONCLUSION

Both multimodal treatment for colorectal cancer and the disease itself result in a number of side effects that affect the quality of life and activities of daily living of colorectal cancer patients. The role of rehabilitation based on a biopsychosocial model is to prevent disability and achieve the highest quality of life possible. Numerous worldwide cancer studies have shown a significant correlation between overall quality of life and survival rates.

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